U.S. DEPARTMENT OF COMMERCE PATENT & TRADEMARK OFFICE

B/O Form PTO-1390 **Transmittal Letter to the United States Designated/Elected Office (DO/EO/US) Concerning a Filing Under *35 USC 371***		*Attorney's Docket Number* MODL3002/JEK
		U.S Application Number (if known) 10/030163
International Application Number PCT/EP00/07123	*International Filing Date* 25 July 2000	*Priority Date Claimed* 30 July 1999
Title of Invention METHOD, DEVICE AND SYSTEM FOR BIOMETRICALLY AUTHENTICATING A PERSON		
Applicant(s) for DO/EO/US Albert MÖDL et al.	Assignee	

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items under *35 USC 371*:

1. ☒ This is a **FIRST** submission of items concerning a filing under *35 USC 371*.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under *35 USC 371*.
3. ☒ This express request to begin national examination procedures *(35 USC 371(f))* at any time rather than delay examination until the expiration of the applicable time limit set in *35 USC 371(b)* and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed *35 USC 371(c)(2)*.
   a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English *(35 USC 371(c)(2))*.
7. ☒ Amendments to the claims of the International Application under PCT Article 19 *(35 USC 371(c)(3))*
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 *(35 USC 371(c)(3))*.
9. ☒ An oath or declaration of the inventor(s) *(35 USC 371(c)(4))*. (☐ Executed ☒ Unexecuted)
10. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 *(35 USC 371(c)(5))*.

Items 11 to 16 below concern other document(s) or information included:

11. ☐ An Information Disclosure Statement under *37 CFR 1.97* and *1.98*.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with *37 CFR 3.28* and *3.31* is included.
13. ☒ A **FIRST** preliminary amendment.
    ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☐ Other items or information:

1 CJ03 Rec'd PCT/PTO 30 JAN 2002

Application Number (if Known) 10/030163	*International Application Number* PCT/EP00/07123		*Attorney's Docket Number* MODL3002/JEK	
			Calculations	**PTO USE ONLY**

17. The following fees are submitted:

Basic National Fee *(37 CFR 1.492(a)(1)-(5))*:

- ☒ Search report has been prepared by the EPO or JPO $890.00
- ☐ International Preliminary Examination Fee paid to USPTO *(37 CFR 1.482)* $710.00
- ☐ No International Preliminary Examination Fee paid to USPTO *(37 CFR 1.482)* but International Search Fee paid to USPTO *(37 CFR 1.445(a)(2))* $740.00
- ☐ Neither International Preliminary Examination Fee *(37 CFR 1.482)* nor International Search Fee *(37 CFR 1.445(a)(2))* paid to USPTO $1040.00
- ☐ International Preliminary Examination Fee paid to USPTO *(37 CFR 1.482)* and all claims satisfied provisions of PCT Article 33(1)-(4) $100.00

				Calculations	PTO USE ONLY
ENTER APPROPRIATE BASIC FEE AMOUNT				$ **890.00**	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date *(37 CFR 1.492(e))*.					
CLAIMS	**NUMBER FILED**	**NUMBER EXTRA**	**RATE**		
Total Claims	18 -20 =		× $18.00		
Independent Claims	2 -3 =		× $84.00		
Multiple Dependent Claims (if applicable)			+ $280.00		
TOTAL OF ABOVE CALCULATIONS				$ **890.00**	
Reduction by ½ for filing by small entity, if applicable. Small Entity Status is asserted pursuant to 37 CFR 1.27 for this application.					
SUBTOTAL				$ **890.00**	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date *(37 CFR 1.492(f))*.					
TOTAL NATIONAL FEE				$ **890.00**	
Fee for recording the enclosed assignment *(37 CFR 1.21(h))*. The assignment must be accompanied by an appropriate cover sheet *(37 CFR 3.28, 3.31)*. **$40.00** per property.					
TOTAL FEES ENCLOSED				$ **890.00**	
			Amount to be:	Refunded:	
				Charged:	

a. ☒ A check in the amount of $890.00 to cover the fees is enclosed.

b. ☐ Please charge my **Deposit Account Number 02-0200** in the amount of $ ________ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to **Deposit Account Number 02-0200**. A duplicate copy of this sheet is enclosed.

Note: Where an appropriate time limit under *37 CFR 1.494* or *1.495* has not been met, a petition to revive *(37 CFR 1.137(a) or (b))* must be filed and granted to restore the application to pending status.

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DATE: 30 January 2002

Respectfully submitted,

J. Ernest Kenney
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

International Patent Application No. PCT/EP00/07123

PCT/DO/EO/US

International Filing Date: 25 July 2000

Applicant: Albert MÖDL et al.

Attorney Docket: MODL3002/JEK

For: METHOD, DEVICE AND SYSTEM FOR BIOMETRICALLY AUTHENTICATING A PERSON

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

This paper accompanies documents submitted to establish the U.S. national stage of the above-identified international patent application.

The international patent application was amended under PCT Article 34 and the claims as-amended are annexed to the International Preliminary Examination Report (IPER).

Before calculation of the filing fee and before examination, kindly amend the claims as annexed to the IPER as follows:

IN THE CLAIMS:

Please amend the claims as annexed to the IPER as shown on the appended APPENDIX OF CLAIMS, which includes amended and non-amended claims. Also appended hereto an APPENDIX OF MARKED UP CLAIMS showing the changes which have been made.

REMARKS

All rights are reserved to the original claimed subject matter. The claims have been amended to reduce the filing fees and to restate the inventive subject matter in clear terms. None of the amendments are intended to narrow any element of the

claims as they stood prior to amendment. Examination of the application as amended is respectfully requested.

Respectfully submitted,
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Date: January 30, 2002

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International Application No. PCT/EP00/07123
Attorney Docket: MODL3002

APPENDIX OF CLAIMS

1 . A method for biometric authentication of a person, comprising the steps of

- detecting a person's biometric data and storing the detected biometric data as reference data,

- determining a parameter with reference to the person's individual properties influencing the sensory detection of the biometric data, and storing the determined parameter to be taken into account in at least one of the following method steps,

- redetecting the person's biometric data,

- comparing the redetected biometric data for a match with the reference data, and

- authenticating the person if the match reaches a degree above a defined threshold value.

2. A method according to claim 1, characterized in that the determined parameter is taken into account in the step of authenticating the person.

3. A method according to claim 2, characterized in that the defined threshold value is dependent on the determined parameter.

4(Amended). A method according to claim 1, characterized in that the determined parameter is taken into account in the step of redetecting the biometric data.

5. A method according to claim 4, characterized in that the determined parameter is used for adjusting a sensor system for redetecting the biometric data.

6(Amended). A method according to claim 1, characterized in that the person is granted limited possibilities of activity depending on the determined parameter.

7(Amended). A method according to claim 1, characterized in that the person is granted limited possibilities of activity depending on the degree of the match between the redetected biometric data and the stored reference data.

8(Amended). A method according to claim 1, characterized by the additional step of adapting a sensor system for redetecting the biometric data to the environmental conditions prevailing at the time of redetection.

9. A method according to claim 7, characterized in that the environmental conditions prevailing during detection of the biometric data as reference data are stored and taken into account when the sensor system is adapted upon redetection of the biometric data to the environmental conditions prevailing at the time of redetection.

10. An apparatus comprising a first memory area with a person's biometric data as reference data and a second memory area with a parameter determined with reference to the person's individual properties influencing the sensory detection of the biometric data.

11. An apparatus according to claim 10, characterized in that the apparatus is a data carrier, in particular a smart card.

12(Amended). An apparatus according to claim 10, comprising a third memory area with information on the environmental conditions prevailing during detection of the biometric data contained in the first memory area.

13(Amended). A system comprising

- an apparatus according to claim 10,
- a first device for detecting a person's biometric data, and
- a second device for comparing the reference data stored in the first memory area of the apparatus for a match with the person's detected biometric data

and authenticating the person if the match reaches a degree above a defined threshold value, at least one of the devices being coupled with the parameter stored in the second memory area of the apparatus.

14. A system according to claim 13, characterized in that the second memory area of the apparatus with the determined parameter and the device for authenticating the person are coupled by the defined threshold value depending on the determined parameter.

15(Amended). A system according to claim 13, characterized in that the second memory area with the determined parameter and the device for detecting the person's biometric data are coupled by the determined parameter being taken into account during adjustment of a sensor system for detecting the biometric data.

16(Amended). A system according to claim 13, characterized in that the system contains an activity filter which is variable in dependence on the determined parameter.

17(Amended). A system according to claim 13, characterized in that the system contains an activity filter which is variable in dependence on the degree of the match between the redetected biometric data and the stored reference data.

18(Amended). A system according to claim 13 insofar as dependent on claim 12, characterized in that the device for detecting the person's biometric data includes a sensor system which is variably adjustable to the environmental conditions prevailing during detection of the person's biometric data depending on the information stored in the third memory area of the apparatus.

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Attorney Docket: MODL3002

APPENDIX OF MARKED UP VERSION OF CLAIMS

4(Amended). A method according to [any of claims 1 to 3] claim 1, characterized in that the determined parameter is taken into account in the step of redetecting the biometric data.

6(Amended). A method according to [any of claims 1 to 5] claim 1, characterized in that the person is granted limited possibilities of activity depending on the determined parameter.

7(Amended). A method according to [any of claims 1 to 6] claim 1, characterized in that the person is granted limited possibilities of activity depending on the degree of the match between the redetected biometric data and the stored reference data.

8(Amended). A method according to [any of claims 1 to 7] claim 1, characterized by the additional step of adapting a sensor system for redetecting the biometric data to the environmental conditions prevailing at the time of redetection.

12(Amended). An apparatus according to claim 10 [or 11], comprising a third memory area with information on the environmental conditions prevailing during detection of the biometric data contained in the first memory area.

13(Amended). A system comprising

- an apparatus according to [any of claims 10 to 12] claim 10,
- a first device for detecting a person's biometric data, and
- a second device for comparing the reference data stored in the first memory area of the apparatus for a match with the person's detected biometric data and authenticating the person if the match reaches a degree above a defined threshold

value, at least one of the devices being coupled with the parameter stored in the second memory area of the apparatus.

15(Amended). A system according to claim 13 [or 14], characterized in that the second memory area with the determined parameter and the device for detecting the person's biometric data are coupled by the determined parameter being taken into account during adjustment of a sensor system for detecting the biometric data.

16(Amended). A system according to [any of claims 13 to 15] claim 13, characterized in that the system contains an activity filter which is variable in dependence on the determined parameter.

17(Amended). A system according to [any of claims 13 to 16] claim 13, characterized in that the system contains an activity filter which is variable in dependence on the degree of the match between the redetected biometric data and the stored reference data.

18(Amended). A system according to [any of claims 13 to 17] claim 13 insofar as dependent on claim 12, characterized in that the device for detecting the person's biometric data includes a sensor system which is variably adjustable to the environmental conditions prevailing during detection of the person's biometric data depending on the information stored in the third memory area of the apparatus.

Method, apparatus and system for biometric authentication of a person

The present invention relates in general to authentication of a person by detecting individual biometric features of said person and comparing them with corresponding, previously stored biometric features of the same person. In particular, the invention relates to a method for biometric authentication of a person, an apparatus used in this connection - for example a data carrier such as a smart card, etc. - and a system comprising such an apparatus and devices for detecting and comparing the biometric features.

For biometric authentication, a person's biometric features, for example a fingerprint, are checked by detecting the biometric feature and comparing it for sufficient similarity with a previously stored biometric feature. Positive comparison grants said person access to data, admission to rooms and similar measures protected from unauthorized access. The biometric features stored as reference data can be stored in any apparatus, for example a fingerprint door opener, or be portable by being stored in a smart card such as a money card, credit card, ID card and the like.

Biometric data can usually not be determined in precisely reproducible fashion, so that a match of stored reference data with currently measured comparative data is virtually impossible. For this reason the result of comparison is fixed as already positive if the match of the compared data exceeds a general threshold value, for example if only a 50 percent match is ascertained.

A disadvantage here is that the detection quality of biometric features varies from person to person. For example, the measuring result of a fingerprint is worse in the case of dry skin or very moist skin. Therefore, the threshold value is usually set altogether very low in order to be permit reliable authentication of all persons. However, a low threshold value simultaneously means a low security standard for access-protected facilities.

The problem of the present invention is therefore to provide a method, apparatus and system for more reliable biometric authentication.

This problem is solved according to the invention by the features of the independent claims. Advantageous embodiments of the invention are stated in the subclaims.

WO 95/26013 A1 discloses a system for biometric authentication wherein not only a specific biometric feature is stored and evaluated but also a non-specific biometric feature. During evaluation it is first checked whether the specific biometric feature of a person to be authenticated matches the stored specific biometric feature. After a successful check the non-specific biometric feature is also checked. The check of the non-specific biometric feature is supposed to ensure that the person being checked is actually present in person at the check.

DE 196 48 767 A1 discloses a smart card having a sensor for detecting fingerprints. In addition, the smart card contains memories in which the features of a fingerprint detected by the sensor are stored for a later check upon the first use of the card.

The invention is based on the finding that authentication can be made more reliable altogether if the authentication process takes account of a parameter unique to each person which is determined with reference to this person's individual feature quality. For the biometric feature "fingerprint," for example, skin moisture is a quality factor. If the person in question has skin which is comparatively neither especially dry nor especially moist, the parameter for the individual feature quality is fixed at over 100 percent of a standard value, and in the case of especially moist or especially dry skin at a value under 100 percent of the standard value.

This increased or reduced individual parameter as an absolute deviation from the standard value can then be taken as a measure of the lowering of the individual threshold value over a standard threshold value. The standard threshold value can be fixed comparatively high, for example at 80 percent instead of the abovementioned 50 percent. The individual threshold value is then in the range of 50 percent to 80 percent depending on the individual feature quality. This accordingly impedes imitation of the biometric feature, thereby likewise increasing the security of the system.

Alternatively, the parameter for the individual feature quality, once determined, can be used to adjust the sensor system of a measuring instrument used for redetecting the biometric feature for the purpose of authentication. With capacitive measurement of the fingerprint, the quantity of electricity is increased over the standard setting in the case of suitable skin and accordingly reduced with less suitable skin.

Accordingly, it can be expedient to determine separate parameters for different properties influencing a certain person's feature quality, said parameters either being taken into account individually for adjusting the sensor system of a measuring instrument or entering a threshold value individual for this person. A combination of these two measures is also possible.

The inventive method works as follows. First, a person's biometric data, for example a fingerprint, are detected and stored as reference data. The data can be stored for example in a first memory area of a data carrier, for example smart card. Said reference data are usually detected in a secure environment and under the instruction of experienced technical personnel. During this phase of reference data detection, user-unique information on the quality of the biometric feature is additionally determined and stored in a second memory area. The user-unique information can be for example

the moisture of the skin or a similar individual property of the person in question relevant to the biometric feature. This information about the individual feature quality serves as a parameter in the following verification phase.

In the verification phase, the same biometric feature of the person in question is redetected and converted into biometric data which are compared with the biometric feature stored as reference data in the first memory area. This comparison leads to a match of regularly under 100 percent. Whether this match suffices for authentication depends on whether a predetermined threshold value is exceeded, said value in turn depending on the parameter stored in the second memory area. If the person in question has average skin moisture, for example, the stored parameter has a value of 100 percent. The threshold value is accordingly adjusted to the highest average threshold value. The average threshold value can be adjusted for example to an 80 percent match, so that in the present case authentication only takes place if the match is at least 80 percent. With especially suitable or especially unsuitable skin, the parameter would be for example 120 percent or 80 percent and the associated threshold value accordingly lower, so that authentication already takes place at a 64 percent match, for example.

The parameter can be used alternatively or additionally to adapt the sensor system for redetecting the biometric data in the verification phase to the person's individual feature quality. As mentioned at the outset, the quantity of electricity of a capacitive fingerprint sensor would be increased (e.g. by 16 percent) over the standard setting according to the parameter (e.g. 120 percent) in the case of suitable skin, and accordingly reduced (e.g. to 64 percent) in the case of less suitable skin (parameter 80 percent).

In a further embodiment of the invention it is provided that the possibilities of activity granted the person after successful authentication are limited ("activity filter"), e.g. it can be provided that a maximum amount is stipulated for financial transactions. The limitation is performed either if this person's individual feature quality is bad by nature, i.e. the stored parameter deviates from the standard value, or if the individual feature quality is basically good but the comparison between the stored reference data and the currently detected biometric data is only slightly above the associated, individ-

ual threshold value. In both cases there is a comparatively great danger that the redetected biometric data were manipulated.

A further advantageous embodiment of the invention provides that the sensor system for redetecting the biometric data during the verification phase is adapted in such a way that roughly the same measuring results are always achieved independently of the particular environmental conditions. For example, the quantity of electricity can be adjusted in dependence on the humidity in the case of capacitive fingerprint sensors. Environmental influences vary constantly in different places (e.g. bank branches) and at different times of the day or year. The above-described measure can therefore make authentication more reliable in the end. Other environmental influences are for example the lighting conditions, temperature, etc. Such influences can be taken into account by adjusting a camera with respect to film speed, for example, or electrically heating a capacitive sensor chip for detecting the fingerprint. It is especially advantageous if the sensor system is adapted to the environmental conditions prevailing in the phase of reference data detection. For this purpose the environmental conditions prevailing during reference data detection are stored in a third memory area so that they are available together with the individual parameters and reference data.

Claims

1. A method for biometric authentication of a person, comprising the steps of
   - detecting a person's biometric data and storing the detected biometric data as reference data,
   - determining a parameter with reference to the person's individual properties influencing the sensory detection of the biometric data, and storing the determined parameter to be taken into account in at least one of the following method steps,
   - redetecting the person's biometric data,
   - comparing the redetected biometric data for a match with the reference data, and
   - authenticating the person if the match reaches a degree above a defined threshold value.
2. A method according to claim 1, characterized in that the determined parameter is taken into account in the step of authenticating the person.
3. A method according to claim 2, characterized in that the defined threshold value is dependent on the determined parameter.
4. A method according to any of claims 1 to 3, characterized in that the determined parameter is taken into account in the step of redetecting the biometric data.
5. A method according to claim 4, characterized in that the determined parameter is used for adjusting a sensor system for redetecting the biometric data.
6. A method according to any of claims 1 to 5, characterized in that the person is granted limited possibilities of activity depending on the determined parameter.
7. A method according to any of claims 1 to 6, characterized in that the person is granted limited possibilities of activity depending on the degree of the match between the redetected biometric data and the stored reference data.
8. A method according to any of claims 1 to 7, characterized by the additional step of adapting a sensor system for redetecting the biometric data to the environmental conditions prevailing at the time of redetection.
9. A method according to claim 7, characterized in that the environmental conditions prevailing during detection of the biometric data as reference data are

stored and taken into account when the sensor system is adapted upon redetection of the biometric data to the environmental conditions prevailing at the time of re-detection.

10. An apparatus comprising a first memory area with a person's biometric data as reference data and a second memory area with a parameter determined with reference to the person's individual properties influencing the sensory detection of the biometric data.

11. An apparatus according to claim 10, characterized in that the apparatus is a data carrier, in particular a smart card.

12. An apparatus according to claim 10 or 11, comprising a third memory area with information on the environmental conditions prevailing during detection of the biometric data contained in the first memory area.

13. A system comprising
- an apparatus according to any of claims 10 to 12,
- a first device for detecting a person's biometric data, and
- a second device for comparing the reference data stored in the first memory area of the apparatus for a match with the person's detected biometric data and authenticating the person if the match reaches a degree above a defined threshold value,

at least one of the devices being coupled with the parameter stored in the second memory area of the apparatus.

14. A system according to claim 13, characterized in that the second memory area of the apparatus with the determined parameter and the device for authenticating the person are coupled by the defined threshold value depending on the determined parameter.

15. A system according to claim 13 or 14, characterized in that the second memory area with the determined parameter and the device for detecting the person's biometric data are coupled by the determined parameter being taken into account during adjustment of a sensor system for detecting the biometric data.

16. A system according to any of claims 13 to 15, characterized in that the system contains an activity filter which is variable in dependence on the determined parameter.

17. A system according to any of claims 13 to 16, characterized in that the system contains an activity filter which is variable in dependence on the degree of the match between the redetected biometric data and the stored reference data.

18. A system according to any of claims 13 to 17 insofar as dependent on claim 12, characterized in that the device for detecting the person's biometric data includes a sensor system which is variably adjustable to the environmental conditions prevailing during detection of the person's biometric data depending on the information stored in the third memory area of the apparatus.

Abstract

A method, apparatus and system for biometric authentication of a person are proposed. Since the detection of biometric data never matches 100 percent, authentication is already effected when the detected data exceed a defined threshold value in comparison to stored reference data. In order to increase security, the invention provides that information about the person's individual properties influencing the biometric data is stored and taken into account in the authentication process. For example, the threshold value is set low upon comparison of a fingerprint only if the person has exceptionally dry or moist skin. On the other hand, the sensor for detecting the biometric data of the fingerprint can also be set to be more sensitive or less sensitive depending on the stored information.

10030163 ,042502

ATTORNEY/DOCKET NO **MODL3002/JEK**

DECLARATION FOR PATENT APPLICATION AND APPOINTMENT OF ATTORNEY

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name; I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention (Design, if applicable) entitled:

METHOD, DEVICE AND SYSTEM FOR BIOMETRICALLY AUTHENTICATING A PERSON

the specification of which (check one):

☐ is attached hereto, or ☒ was filed on: **25 July 2000** as U.S Application Number or PCT International Application Number **(PCT/EP00/07123) 10/030,163** and (if applicable) was amended on.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above. I acknowledge the duty to disclose information which is material to patentability as defined in *Title 37, Code of Federal Regulations, §1 56*. I hereby claim foreign priority benefits under *Title 35, United States Code §119* of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

PRIOR FOREIGN APPLICATION(S)			PRIORITY CLAIMED	
Number	Country	Day/Month/Year Filed	Yes	No
199 36 097.9	Germany	30 July 1999	X	

☐ Additional Priority Application(s) Listed on Following Page(s)

I HEREBY CLAIM THE BENEFIT UNDER TITLE 35 U.S. CODE §119(E) OF ANY U.S. PROVISIONAL APPLICATIONS LISTED BELOW.	
Application Number	Day/Month/Year Filed

☐ Additional Provisional Application(s) Listed on Following Page(s)

I hereby claim the benefit under *Title 35, United States Code, §120* of any United States application(s) or PCT international application(s) designating The United States of America listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of *Title 35, United States Code, §112*, I acknowledge the duty to disclose information which is material to patentability as defined in *Title 37, Code of Federal Regulations, §1 56* which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:

Application Number	Filing Date	Status - Patented, Pending or Abandoned

☐ Additional US/PCT Priority Application(s) listed on Following Page(s)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under *section 1001 of title 18 of the United States Code* and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: I (We) hereby appoint as my (our) attorneys, with full powers of substitution and revocation, to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: J. Ernest Kenney, Reg. No. 19,179; Eugene Mar, Reg. No 25,893, Richard E. Fichter, Reg. No 26,382; Thomas J. Moore, Reg. No 28,974; Joseph DeBenedictis, Reg. No. 28,502; Benjamin E. Urcia, Reg. No. 33,805; and

I(we) authorize my(our) attorneys to accept and follow instructions from **Klunker, Schmitt-Nilson, Hirsch** regarding any matter related to the preparation, examination, grant and maintenance of this application, any continuation, continuation-in-part or divisional based thereon, and any patent resulting therefrom, until I(we) or my(our) assigns withdraw this authorization in writing.

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DATE X 22 March 2002	SIGNATURE X Albert Mödl

☒ *See following page(s) for additional joint inventors.*

10013016.3 .042502

ATTORNEY/DOCKET NO: **MODL3002/JEK**

CONTINUATION OF DECLARATION FOR PATENT APPLICATION AND APPOINTMENT OF ATTORNEY

PRIOR FOREIGN APPLICATION(S) (35 USC §119)			PRIORITY CLAIMED	
Number	Country	Day/Month/Year Filed	Yes	No

PRIOR PROVISIONAL APPLICATIONS 35 U.S. CODE §119(E)	
Application Number	Day/Month/Year Filed

PRIOR U.S. OR PCT INTERNATIONAL APPLICATIONS (35 U.S. CODE §120)		
Application Number	Filing Date	Status - Patented, Pending or Abandoned

FULL NAME OF JOINT INVENTOR	CITIZENSHIP
2-00 Elmar STEPHAN	Germany ✓
RESIDENCE ADDRESS Dankistrasse 13, D-81371 Munchen, Germany DEX .	POST OFFICE ADDRESS IS THE SAME AS RESIDENCE ADDRESS UNLESS OTHERWISE SHOWN BELOW
DATE X 22 March 2002	SIGNATURE X

FULL NAME OF JOINT INVENTOR	CITIZENSHIP
3-00 Robert MÜLLER	Germany ✓
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DATE X 03 April 2002	SIGNATURE X

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☐ *See following pages for additional joint inventors/priority applications.*